

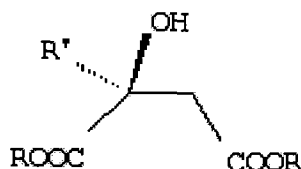
AMENDMENTS TO THE CLAIMS

This listing of claims replaces all previous claims, and listings of claims, in the application.

Claim 1. (Currently Amended): A continuous process for the production of chemically pure (S)- β -hydroxy- γ -butyrolactone having desired optical activity, which comprises:

a) dissolving a carboxylic acid ester derivative having the following Formula 2 in solvent at an amount of 2-50 wt%, the solvent being added with an organic or inorganic acid;

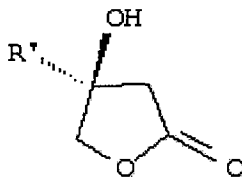
Formula 2



b) subjecting the carboxylic acid ester derivative solution to hydrogenation at 50-500 °C under a pressure of 15-5,500 psig at weight-hourly-space-velocity of 0.1-10 h⁻¹, in a fixed bed reactor charged with a metal catalyst-impregnated inorganic oxide support wherein the metal catalyst is selected from the group consisting of nickel (Ni), palladium (Pd), platinum (Pt), rhodium (Rh), iridium (Ir), ruthenium (Ru), osmium (Os), and combinations thereof, with a molar ratio of hydrogen to carboxylic acid ester derivative ranging from 2 to 10; and

c) recovering (S)- β -hydroxy- γ -butyrolactone having the following Formula 4 from the hydrogenation products,

Formula 4

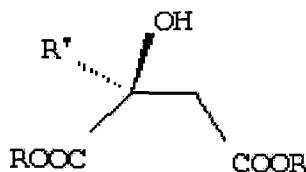


wherein R represents linear or cyclic alkyls, or aryl groups, of from 1 to 10 carbon atoms, and R' represents hydrogen or methyl.

Claim 2. (Currently Amended): A continuous process for the production of chemically pure (S)- β -hydroxy- γ -butyrolactone having desired optical activity, which comprises:

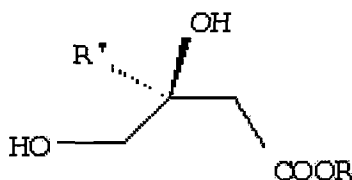
a) dissolving a carboxylic acid ester ~~derivative~~ having the ~~following~~ Formula 2 in solvent at an amount of 2-50 wt%, the solvent being added with an organic or inorganic acid;

Formula 2

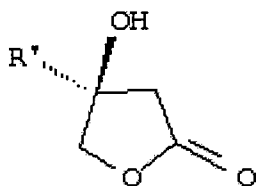


b) subjecting the carboxylic acid ester derivative solution to hydrogenation at 50-500 °C under a pressure of 15-5,500 psig at weight-hourly-space-velocity of 0.1-10 h⁻¹, in a fixed bed reactor charged with a metal catalyst-impregnated inorganic oxide support, wherein the metal catalyst is selected from the group consisting of nickel (Ni), palladium (Pd), platinum (Pt), rhodium (Rh), iridium (Ir), ruthenium (Ru), osmium (Os), and combinations thereof, to give hydrogenation products containing an intermediate having the following Formula 3 and (S)- β -hydroxy- γ -butyrolactone having the ~~following~~ Formula 4, with a molar ratio of hydrogen to a carboxylic acid ester ~~derivative~~ ranging from 2 to 10; and

Formula 3



Formula 4



c) subjecting the hydrogenation products to cyclization in the presence of a sulfonate-substituted resin solid acid catalyst, whereby the intermediate present therein is converted into (S)- β -hydroxy- γ -butyrolactone; and

d) recovering said (S)- β -hydroxy- γ -butyrolactone from the resulting products,

wherein R represents linear or cyclic alkyls, or aryl groups, of from 1 to 10 carbon atoms, and R' represents hydrogen or methyl.

Claim 3. (Cancelled).

Claim 4. (Previously Presented): The process as defined in claim 1, wherein the metal catalyst is impregnated at an amount of 0.1-15 wt%.

Claim 5. (Currently Amended): The process as defined in claim 1 3, wherein the metal catalyst is ruthenium (Ru).

Claim 6. (Previously Presented): The process as defined in claim 1, wherein a degree of dispersion of the metal in the catalyst is adjusted in the range of 2-50%.

Claim 7. (Previously Presented): The process as defined in claim 1, wherein the hydrogenation step is performed at 60-200 °C.

Claim 8. (Previously Presented): The process as defined in claim 1, wherein the hydrogenation step is performed under a pressure of 1,200-4,500 psig.

Claim 9. (Previously Presented): The process as defined in claim 1, wherein the hydrogenation step is carried out at weight-hourly-space-velocity of $0.2-6.0 \text{ h}^{-1}$.

Claim 10. (Previously Presented): The process as defined in claim 1, wherein the organic or inorganic acid additive in the solvent is added at an amount of 0.1-20 wt%, based on the solvent weight.

Claim 11. (Previously Presented): The process as defined in claim 1, wherein the solvent is selected from the group consisting of methyl alcohol, ethyl alcohol, n-propyl alcohol, isopropyl alcohol, dioxane, γ -butyrolactone, tetrahydrofuran, water, and combinations thereof.

Claim 12. (Previously Presented): The process as defined in claim 1, wherein the acid additive is selected from the group consisting of formic acid, oxalic acid, nitric acid, DL-malic acid, acetic acid, sulfuric acid, phosphoric acid, hydrochloric acid, and combinations thereof.

Claim 13. (Previously Presented): The process as defined in claim 1, wherein the inorganic oxide support is selected from the group consisting of alumina, silica, silica-alumina, zirconia, titania, zeolite and a molecular sieve.

Claim 14. (Currently Amended): The process as defined in claim 1, wherein the carboxylic acid ester ~~derivative~~ is obtained by reacting carboxylic acid with a linear, cyclic or aromatic alcohol having 1-10 carbon atoms in the presence of a sulfonate-substituted resin ~~solid acid-catalyst~~, under conditions of a temperature of 50-150 °C, a pressure of 1.0-300 psig and weight-hourly-space-velocity of $0.1-10 \text{ h}^{-1}$, in which the alcohol is used at an amount of 2.0-40 equivalents based on the carboxylic acid.

Claim 15. (Original): The process as defined in claim 14, wherein said carboxylic acid is L-malic acid or L-citramalic acid.

Claim 16. (Currently Amended): The process as defined in claim 2, further comprising removing carboxylic acid capable of being present in the hydrogenation products of the step b) through esterification with alcohol in the presence of an acid catalyst prior to the step c) wherein the acid additive is selected from the group consisting of formic acid, oxalic acid, nitric acid, DL-malic acid, acetic acid, sulfuric acid, phosphoric acid, hydrochloric acid, and combinations thereof.